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## Influence of certain climatic factors on some major pepper pests under Egyptian conditions

Amna. M. H. Maklad<sup>1</sup>, Samia, A. Yassin<sup>1</sup> and . Y. Abd El-Ghafar<sup>2</sup>

- 1- Plant Protection Research Institute, Agricultural Research Center, Dokki, Egypt.
- 2- Plant Pathology Dept., Fac. Agric. Ain Shams Univ. Shoubra El-Kheima, Cairo, Egypt

### ABSTRACT

Pepper crop (*Capsicum annum*,l) is considered one of the most important vegetable crops, under greenhouse conditions. This work aim to study influence of certain environmental factors (Temperature and relative humidity) on population of pepper pests i.e. aphid (*Aphis gossypii*), white fly (*Bemisia tabaci*) and spider mites (*Tetranychus urticae*), through growing seasons 2012 and 2 013, at two different regions (El-Dokki region, Giza governorate and El-Nobria region, Beheria governorate), Egypt. Population of white fly was the most severity compared with other pests, but population of aphid was moderately severity and population of spider mites was less severity. While, population of tested pests were more severity in El-Nobria region (Beheria governorate) than El\_Dokki region (Giza governorate). However, population of tested pepper pests were increased with increasing the temperature through studied seasons. Also, population of tested pests were the most severity during the period from May to June compared with the period from January to March for growing seasons and two regions. Population of all pepper pests were the most severity during may in El\_Nobria region (Beheria governorate) during may-june in El-Dokki region (Giza governorate) Meanwhile, relative humidity was less effectively on population of tested pepper pest through this study.

**Keywords:** *Capsicum annum*, climate region, *Aphis gossypii*, *Tetranychus urticae*, *Bemisia tabaci*, Polyethylene sheet, greenhouse.

### INTRODUCTION

Pepper, *Capsicum* sp. is a member of the Solanaceous family and commonly divided into two groups, pungent and non-pungent, which also called hot and sweet pepper. Sweet pepper includes different cultivars and the most commonly used ones, in greenhouse production, are hybrids that have bell-shaped (*Capsicum annum* L.). Sweet pepper is considered one of the most important vegetable crops in Egypt. The average Egyptian annual consumption from pepper is about 5.4 kg/ capita, which mean that the total Egyptian consumption is around 446 tons/ year (Agric. Economic Institute.2007). In addition pepper is one of the most important exportable crops in

Egypt. Egypt has the potential to become an exporter of tomatoes, cucumbers and peppers. However, it is not yet clear whether they will be able to compete price-wise with the Spanish in the winter period. They have the opportunity to produce a guaranteed quality level with which they can maximize the market windows with a quality product in periods of limited supplies and thus compete with Spain. Organic product could be a part of this. The knowledge and the managerial capacity present in Egypt seems sufficient to adopt new technologies and to enter new markets. drew the same conclusion regarding the country's potential. In 2003, some of this potential had become reality. However, exports to Western countries are very small, amounting to hundreds rather than thousands of tons a year. Compared with the Netherlands, the level is negligible.

Although insect pests have been on problem in agriculture through the centuries, phenomenon of pest outbreaks have increased with the change of pest complexities, in the last four decades. Some insects have increased in severity, where others have declined in importance. There is evidence that (specialized species) have been favored by crop intensification. Infestation engrosses the change in cultural practices such as (1) increase of crop cycle per year,(2) augmentation of agricultural chemicals (fertilizer and pesticides), (3) improvement of irrigation facilities and (4) enhancement of higher plant densities (Cuperus, *et al.*,1982) Manley (1983), Hassan (1983), Bulut *et al.* (2000), Mohamed (2001) and Saad (2002), Sallam *et al.* (2009) and Maklad *et al.* (2012) stated that vegetables under protected cultivation attacked by numerous insects and mites caused serious damage and high yield was lost. The cultivated area from cucumber and pepper plants increased during the last two decades especially in winter plantation, in both open and protected plantation. Spiders are the most abundant predators in agricultural system. Chakraborty (2011) found that a biotic conditions such as maximum, minimum, gradient and average temperature, minimum relative humidity and sunshine hours had significant negative influence on *Aphis gossypii* population, but in case of maximum relative humidity and relative humidity gradient a positive influence. The present work aim to study effect of certain environmental factors (temperature and relative humidity) on population of pepper pests (Aphid, Whitefly and spider mites) under Egyptian conditions.

## MATERIAL AND METHODS

The experiment was carried out in the Experimental Protected Cultivation sites at El-Nobria in the North governorate and at El-Dokki region, Giza governorate, Behera, Egypt, during two successive seasons of 2012 and 2013. Four greenhouses were chosen to carry out this study. Area of traditional greenhouse is 240 m<sup>2</sup> with 40m long, 6m wide and 3.25 M high. Greenhouse unit consists of five rows is 1m wide and 40m long and distance between two seedling in the row is 50 CM. Standard agricultural practices were applied at these greenhouse.

### **Meteorological data:**

Climatic data were recorded as maximum and minimum temperatures and relative humidity through the period from January to June for two successive seasons of 2012-2013. Averages of environmental factors were calculated to daily maximum and minimum temperatures and relative humidity under greenhouse conditions were obtained from Central Laboratory for Agriculture Climate, Ministry of agriculture, Giza, Egypt.

**Assesment of pepper pests:**

Adult insects of whitefly (*Bemisia tabaci*), aphid (*Aphis gossypii*), spider mites (*Tetranychus urticae*) were estimated on pepper leaves. The numbers of pests were weekly counted on the terminal leaflet of one leaf of each plant. Fifty plants per row were randomly selected from the middle row in each plot. Five leaves were examined per plant using a hand lens. In case of whitefly, leaves were carefully inverted and adults counted in the morning hours when adults are less easily disturbed (Cszinszky, *et al.*, 1999). Data were statistically analyzed using the "F" test and LSD value (P=0.5) was calculated according to (Snedicor and Cochran 1981).

**RESULTS AND DISCUSSION**

Data in Table (1) showed that population of whitefly was the most severity compared with other pests, where mean number of adult pest per pepper leaf was ranged from 107.0 to 178.0, but population of aphid was moderately severity where mean number of adult pest per pepper leaf was ranged from 105.0 to 150.0 and population of spider mite was less severity where mean number of adult pest per pepper leaf was ranged from 79.5 to 88.5. Meantime, population of tested pests were more severity in El-Nobria region (Beheria governorate) than El-Dokki region (Giza governorate), where mean number of adult pest per pepper leaf was 84.0 – 178.0 and 79.5-168.0 respectively. Survey of insect and animal pests gives the growers a picture of the risk of plant protection would be take attention to crop management (Manley, 1983). In the recent years, growing vegetables in expanding, under protected cultivation in Egypt.

Table 1: Population of pepper pests, through growing seasons 2012 and 2013 (January - June), at EL-Dokki region (Giza governorate) and El-Nobaria region (Beheria governorate).

Pest	season	Mean number of adult pest/leaf	
		A	B
Aphid	2012	111.0	150.0
	2013	105.0	145.0
Spider mite	2012	79.5	84.0
	2013	88.5	89.9
whitefly	2012	168.0	176.0
	2013	107.0	178.0

A = El-Dokki region, Giza governorate.

B = El-Nobria region, Beheria governorate

LsD at 5% for

Pest	6.4
Season	5.3
Region	3.6
Interaction	9.2

El-Aidy *et al.*, 2007 The major pests were *Thrips tabaci*, *Tetranychus cinnabarnus*, *Aphis gossypii* and *Trialeurodes vaporariorum* on tomato, cucumber, pepper and lecture plants under greenhouse conditions (YasaraKinci and Hincal, 1997).

Result in Figs. (1 and 2) mentioned that population of pepper pests (aphid, whitefly and spider mite) were increased with increasing the temperatures under protected cultivation, through the period from January to June for growing seasons 2012 and 2013, at El-Dokki region (Giza governorate) and El-Nobria region (Beheria governorate), where mean number of adult pest per pepper leaf was increased from 5.0 to 22.0 for spider mite, from 9.0 to 25.0 for whitefly and from 3.0 to 36.0 for

aphid, at El-Dokki region, when the temperature was increased from 13.0 to 27.2°C and mean number of adult pest pepper leaf was increased from 8.0 to 22.0 for spider mite, from 18.0 to 42.0 for whitefly and from 12.0 to 35.0 for aphid, at El-Nobria region, when the temperature was increased from 12.7 to 38.9°C, respectively. Population of tested pests were more severity during the last period (May-June) of this study than the first period (January-March), where in the last period, mean number adult pest per pepper leaf was ranged from 15.0 to 22.0 for spider mite, from 23.0 To 25.0 for whitefly and from 30.0 to 36.0 for aphid in El-Dokki region and from 14.0 to 22.0 for spider mite, from 25.0 to 40.0 for whitefly and from 30.0 to 35.0 for aphid in El-Nobria region, where the temperature was ranged from 25.2 to 27.2°C in El-Dokki region and from 22.0 to 38.9°C in El-Nobria region, respectively, but, in the first period, mean number of adult pest per pepper leaf was ranged from 5.0 to 12.0 for spider mite, from 9.0 to 20.0 for whitefly and from 3.0 to 15.0 for aphid in El-Dokki region and from 8.0 to 14.0 for spider mite, from 18.0 to 13.0 for whitefly and from 12.0 to 23.0 for aphid in El-Nobria region, when the temperature was ranged from 13.0 to 17.3°C in El-Dokki region from 12.7 to 28.7°C in El-Nobria region, respectively. Population of all pepper pests were the most severity during May in El-Nobria region (Beheria governorate) and during May-June in El-Dokki region (Goza governorate), where mean number of adult pests per pepper leaf were ranged from 22.0 to 38.9 and from 22.0 to 40.0, respectively. Meanwhile, relative humidity was less effectively on population of tested pepper pests.

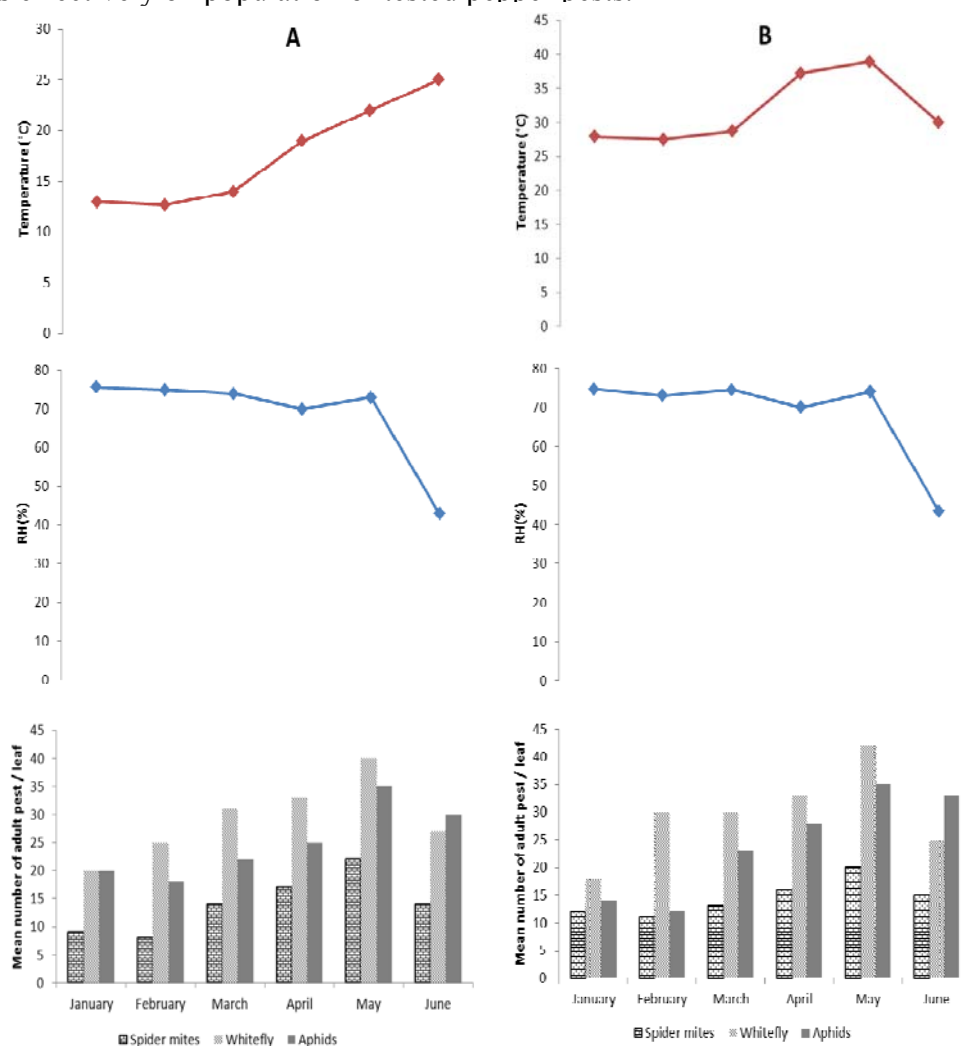


Fig. 1: Effect of certain climatic factors (Temperature and Relative humidity) on population of pepper pest (spider mites, whitefly and aphid), at El-Nobria region (Beheria governorate), during growing seasons (A) 2012 and (B) 2013.

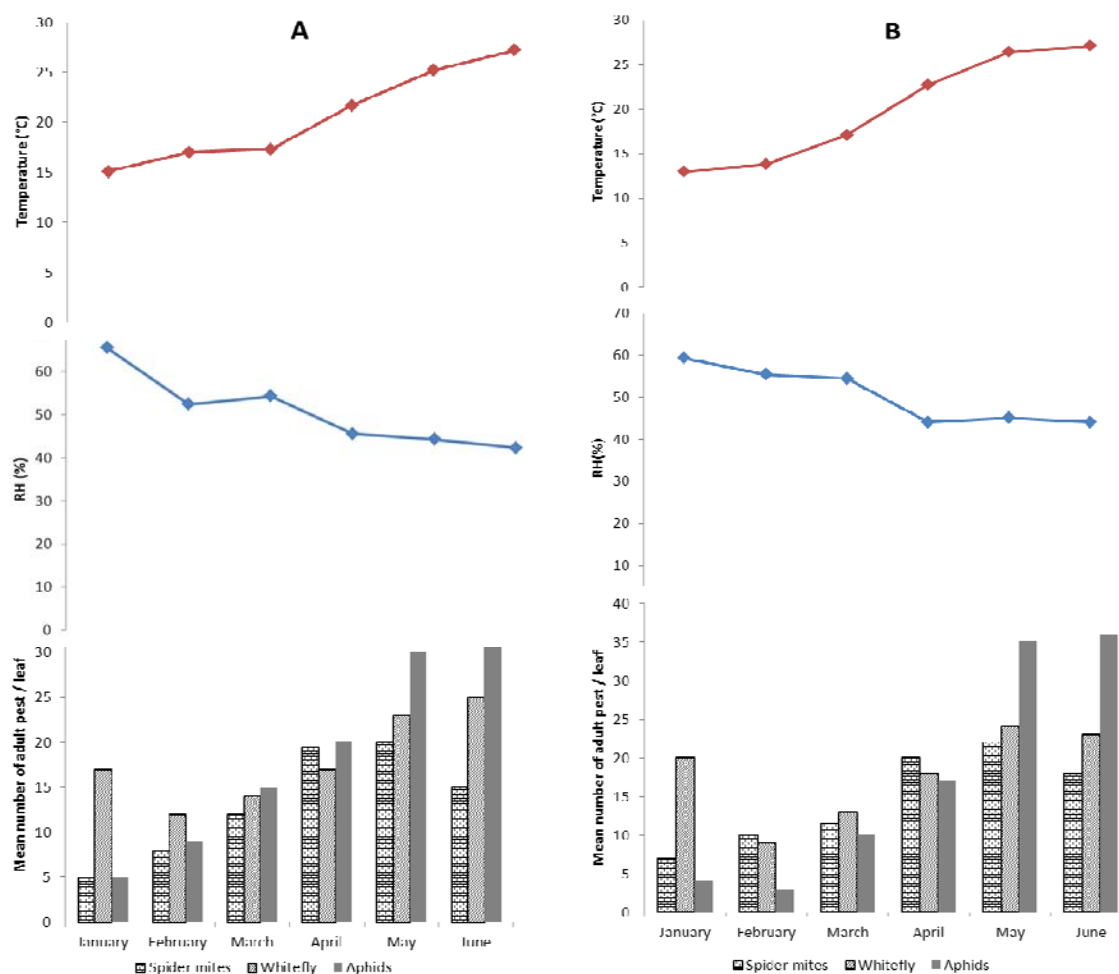


Fig. 2: Effect of certain climatic factors (Temperature and Relative humidity) on population of pepper pest (spider mites, whitefly and aphid), at El-Dokki region (Giza governorate), during growing seasons (A) 2012 and (B) 2013.

Management of greenhouses should be geared towards optimal production condition via provision of appropriate environmental conditions and production imputes by avoiding condition that favor reproduction and development of plant pests (Taher, 1992). Population of *A. gossypii* might reach very high levels in June, causing economic damage to cucumber (Aly, 1993). Insect and mites are the main groups of pests which attack plants causing many types of damage (van lintern, 1992).

(Abou-taka and Zahdy, 1990) mentored that the spider mites in Egypt are one of the most serious pests on vegetable plants. Also, Highly population of *Bemisia tabaci* was found during mid-September to the end of October. Number of *B. tabaci* was moderate in November; low infestation of whitefly was in December and January. Aphid population was high from October to mid-December and then become low before and after this period (Aly, 1993).

## REFERENCES

- Abou-Taka, S. M. and Zohdy, S. (1990). Greenhouses study on the suitable releasing population of the predatory mite, *Amblyseius gossypii* against *Tetranychus urticae* infesting cucumber plants. Minufiya J. Agric. Res., 15:1937-1962.

- Agric. Economic Institute. (2007). Cultivated crops production and annual consumption. Annual Agriculture Economy book (Arabic Text Book).
- Aly, F. A. (1993). Integrated pest management of some sucking insects attacking cucumber plants under protected cultivation in Egypt. *J. Agric. Sci. Mansoura Univ.*, 18: 1967 - 1877.
- Bulut, E. H.; Gocmen; R. Albajes and E. Sekeroglu (2000). Pests and their natural enemies on green house cucumber vegetables in Antalya. *Bulletin OILB. SROP*, 23 (1): 33-37.
- Chakraborty, K. (2011). Incidence of aphid (*Aphis gossypii*, Glover) on tomato crop in the agro-climatic conditions of the Northern Parts of west Bengal, India. *World Journal of Zoology*, 6: 187-191.
- Cuperus, C.W.; Radcliffe, E.B.; Barnes, D.K and Marten, C.C. (1982). Economic – Injury level and Economic thresholds for pea aphid (*Acyrtosiphon pisum*, Harris) on alfalfa .crop. *Prot.*, 1: 453-463.
- Csizinszky, A. A.; Schuster, D. I and Polston, J. E. (1999). Effect of ultraviolet reflective mulches on tomato yields on the silver leaf whitefly. *Hortscience*, 34: 911-914.
- El-Aidy., F. A.; El-Zawedy, A.; Hassan, N. and El-Sawy, M. (2007). Effect of plastic tunnel size on production of cucumber in Delta of Egypt. *Applied Ecology and Environmental Research*, 5: 11-24.
- Hassan, S. A. (1983). A practical method to monitor pests and natural enemies in integrated control experiments under glass, *Bulletin. SROP* , 6 (3) : 186-402.
- Manley, G. V. (1983). Insects associated with tomatoes and cucumbers in the upper Aguan valley of Honduras. *Turrialba*, 33: 409-415.
- Makled, A. M. H.; Abolmaaty, S. M.; Hassanein, M. K. and Abd El-Ghafar, N. Y. (2012). Impact of type of greenhouse cover sheets on certain major cucumber pests under protected cultivation. *New York Science Journal*, 5: 19-24.
- Mohamed, B. (2001). Ecological studies on some pests of protected cultivation in Northern Africa . M. Sc. Thesis, African Studies Institute , Cairo, 157 pp.
- Saad, H. N. ( 2002). Economics of the integrated pest management of certain insect and animal pests on most important vegetable crops production under plastic green house. M. Sc. Thesis, Moshtohor, Zagazig univ., Banha Branch, 143 PP.
- Salam, G. M. E.; Abd El-Azim, N. A. I. and Abd Aal, M. M. (2009). Seasonal occurrence of spiders (Aranedia) in open and green house fields of cucumber and pepper in Egypt. *Egypt. Acad. J. Biology. Sci.*, (B-Zoology). Vol. 1(1) 29-36.
- Snedecor, G. W. and Cochran, W. G. (1981). *Statistical methods*. 7th Iowa State Univ. Press, Iowa, USA, 320 pp.
- Taher, M. M. (1992). Pest control in protected vegetable cultivation in the Near East region. *Arab J. Pt. Prot.*, 10: 68-76.
- Van- Lentern, J. C. (1992). Biological pest control in greenhouse. *Arab J. Pt. Prot.*, 10: 35-43.
- Yasarakinci, N. and Hincal, P. (1997). Determining the pests and beneficial species and their population densities on tomato, cucumber, pepper and lettuce greenhouse in Izmir. *Bitki Koruma Bulltin*, 37: 79-89.

## ARABIC SUMMARY

تأثير بعض العوامل المناخية على تضاعف آفات الفلفل الرئيسية تحت نظم الزراعة المحمية

آمنة محمد حسن عثمان مقلد<sup>1</sup> - سامية عبد الفتاح يسن<sup>1</sup> و ناجى ياسين عبد الغفار<sup>2</sup>

1- معهد وقاية النباتات

2- كلية الزراعة جامعة عين شمس

يعتبر محصول الفلفل من اهم واكثر المحاصيل الزراعية تحت نظم الزراعة المحمية. اجريت تلك الدراسة بغرض دراسة تأثير بعض العوامل المناخية (حرارة - رطوبة) على تضاعف آفات الفلفل خلال موسمي 2012-2013 لمنطقتين مختلفتين (منطقة النوبارية بمحافظة البحيرة - منطقة الدقى محافظة الجيزة) تحت الظروف المصرية. لوحظ أن أصبح تضاعف حشرة الذبابة البيضاء أكثر شدة و تضاعف المن كان معتدل الشده مع ان العنكبوت كان أقل شدة فى التضاعف. أظهرت الآفات المختبرة تضاعف أكثر فى منطقة النوبارية بمحافظة البحيرة بالمقارنة مع منطقة الدقى بمحافظة البحيرة. أكدت النتائج ان تعداد آفات الفلفل زادت مع زيادة درجات الحرارة خلال موسمي الدراسة ولذلك وجد اقصى تضاعف لتعداد تلك الافات ظهر خلال شهرى مايو ويونيو مع ان اقل تضاعف لتعداد تلك الافات وضح خلال الفترة من يناير حتى مارس و أكدت الدراسة أن تعدد تلك الافات تحت الدراسة كانت أكثر شدة خلال فى منطقة النوبارية بمحافظة البحيرة و خلال شهر مايو و يونية فى منطقة الدقى محافظة الجيزة. وكذلك أوضحت النتائج أن الرطوبة النسبية كانت قليل الأهمية أوالتاثير على تضاعف آفات الفلفل خلال هذه الدراسة.